

AMENDMENTS TO THE CLAIMS

Listing of claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Claim 1 (Currently Amended): An integrated circuit comprising a fine vacuum tube element and other electronic elements integrated and formed on a substrate of a semiconductor, the fine vacuum tube element and the other electronic elements transmitting signals to and from each other;

wherein an interference system is constructed and an A/D converter is constructed.

Claim 2 (Original): The integrated circuit as claimed in claim 1, wherein when integrating the vacuum tube element with the other electronic elements, a quantum effect is realized in a room temperature environment by utilizing ballistic electrons (non-scattering electrons) traveling through the vacuum.

Claim 3 (Canceled)

Claim 4 (Previously Presented): The integrated circuit as claimed in claim 1 or 2, wherein an interference system is constructed and weighting of the interference system is constituted for image processing and signal code conversion to realize an advanced function-integrated type.

Claim 5 (Original): The integrated circuit as claimed in claim 1 or 2, wherein a very high-speed light-receiving integrated circuit for optical communication is constructed by utilizing a very high-speed optical response characteristic of electron emission of the vacuum element.

Claim 6 (Original): The integrated circuit as claimed in claim 1 or 2, wherein a sensor such as a magnetic/electric field sensor is constructed by utilizing a quantum effect of ballistically traveling electrons.

Claim 7 (Previously Presented): The integrated circuit as claimed in claim 1 or 2, wherein a thermionic cathode is used as a cathode of the vacuum element.

Claim 8 (Original): The integrated circuit as claimed in claim 7, wherein LaB6 (lanthanum hexaboride) or carbon nanotube is attached to the thermionic cathode.

Claim 9 (Currently Amended): The integrated circuit according to claim ~~[[3]]~~ 1, wherein the interference system is a Mach-Zehnder interferometer.

Claim 10 (Previously Presented): The integrated circuit according to claim 4, wherein the interference system is a Mach-Zehnder interferometer.

Claim 11 (Previously Presented): The integrated circuit device according to claim 1, wherein the other electronic elements are solid state devices.